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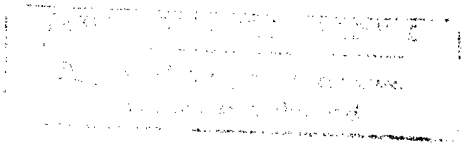
USSR Report

ENERGY

No. 110



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CONTENTS

NUCLEAR POWER DEVELOPMENT PLANS FOR SOVIET UNION

Moscow MATERIAL'NO-TEKHNICHESKOYE SNABZHENIYE in Russian No 2, 1982 pp 67-68

[Article by P. Falaleyev, first deputy minister of power and electrification: "Full speed ahead for nuclear power development"]

[Text] The fairly large number of AES capacities put into operation in the last five year plan was the result of several objective factors. One was that the specifications for construction of AESs are more complicated and labor-intensive than, as it were, erecting traditional energy-producing stations—thermal electric power stations.

The rates of construction and placing into operation of new capacities are currently defined by the management of construction work on the basic structures of the nuclear electric power station, especially on the reactor complex. This is the most critical part of the station, and consequently more stringent requirements are imposed on structural strength and reliability.

The USSR Ministry of Energy has yet to establish the necessary industrial base which can ensure production and unitized delivery to station construction sites of specialized metal structures, including alloys and stainless steel, high-strength precast reinforced concrete and radiation-resistant chemical coatings. The construction industry was set up to manufacture the gamut of items for thermal electric power stations and has not been meeting the new requirements.

The first AES plans were developed without sufficient standardization and employed a low level of factory-furnished structures. This led to the laying of significant quantity of monolithic concrete in fairly large blocks with an inadequate supply of mobile construction and assembly equipment and on-site complex reinforcing and centering work. This resulted in longer AES construction periods and increased living labor costs at the facilities.

The USSR Ministry of Energy carefully analyzed the experience gained in the past and planned ways to fundamentally improve AES construction. Within the near future the manufacture of specialized structures for AESs will be carried out at AES construction plants which will be part of the assembly organizations. These enterprises are assigned to carry out the entire pro-

duction cycle—from the manufacture of industrial structures and their transportation to the assembly site to their on-site emplacement. Nuclear power station construction plants properly outfitted with modern high-output processing equipment can ensure the increased quality and plant-furnished readiness of structural designs and can cut direct labor costs in building the facility. AES construction periods will be reduced and less workers will be required.

The adopted industrial base development schedule contains plans for the construction of three nuclear construction plants to build AESs with VVER-1000 water-moderated water-cooled power reactors and two plants to build AESs with RBMK-1000 reactors. Specialized workshops and repair shops will be further developed at the facilities and this will also be very important.

The Zaporozhskiy, Balakovskiy, Chernobyl'skiy and Kurskiy nuclear construction plants are already under construction. The speed with which they are put into operation and the manner in which they are provided with modern processing and non-standard equipment will to a great extent define the success of the planned AES construction program. The latter largely depends on Soyuzglavstroykomplekt. Its job is to providing equipment and parts for the enterprises which will be building the nuclear electric power stations.

Collaborative experience gained by Soyuzglavstroykomplekt and the Soyuzatomenergostroy All-Union Association shows that this job can be successfully tackled. For example, the first phase of the Zaporozhskiy nuclear construction plant was built on time and with outstanding quality, accelerating the construction of the Zaporozhskaya AES, whose main structures were to be erected by the flow-type production method.

What is the flow-type method? In terms of AES construction, this means that the reactor section is built at one power plant, laying of reactor foundations is finished up at another, the groundwork is completed at a third. This realizes the requirement of the 26th CPSU Congress which calls for intensified production and increased efficiency in the national economy.

This year and in future ones, many more enterprises affecting the performance of AES construction schedules must be put into operation on time, since the capacities for manufacturing specialized AES designs remain as inadequate as before. One of the most important facilities which is to go into operation this year is the Balakovskiy special building structure plant. It will produce 30,000 cubic meters of special high-strength reinforced concrete and 20,000 tons of special metal structures.

Other first-phase facilities are being built up: the production enterprises of the Khmel'nitskiy nuclear construction plant, the specialized workshops at construction sites of the Tatarskaya, Bashkirskaya and Kalininskaya AESs and the Novo-Voronezhskiy plant "Atomzapchast'". Construction will begin soon on the Rovenskiy and Chernobyl'skiy plants "Atomzapchast'" and the non-standardized equipment plant at the Zaporozhskaya AES.

In the next two or three years, these and other facilities will have to be supplied with equipment totalling about 100,000,000 rubles. Nowadays, unfortunately, equipment supply decisions are far from being completely re-

solved. For example, the Yuzhno-Ukrainskiy energy complex includes hydraulic and hydraulic-storage electric stations in addition to nuclear ones. Soyuzglavstroykomplekt was given the plan for the energy complex's industrial base on time. It really would seem to be standard procedure to accept the plan to build up this base on the basis of the planning and estimate documentation.

But that did not happen. Soyuzlgavstroykomplekt rejected outfitting a construction base for the entire complex, though the timely construction of just one nuclear electric power station could not guarantee consumers a reliable and continuous supply of electrical energy. The Ministry of Energy and Electrification trusts that this decision will be reconsidered and that all industrial facilities of the Yuzhno-Ukrainskiy energy complex's construction base will be accepted for equipment build-up.

Work also must be done on delivering materials for nuclear plant construction. It is not just a matter of the quantity of resources delivered. The most important thing is delivery of the proper construction items on time and in the proper sequence.

But what happens in reality? The Yuzhnotrubnyy plant imeni 50th Anniversary of the Great October Socialist Revolution tolerates re-sorting of orders of rust-proof pipe delivered to it. Alloyed armor-plating, especially the 40 millimeter diameter kind, has more than once been in short supply. Untimely delivery of brand 500 cement has thrown off construction schedules for protective casing and other structures. Thus the problems encountered at AES contruction sites are not only due to our growth but also to supply shortages.

USSR Gossnab, it goes without saying, has done a great deal to provide AES construction facilities with materials and equipment. But the problems which energy builders must face in developing nuclear energy can only be resolved if existing shortcomings are eliminated and the entire material and technical supply system is revamped. The USSR Ministry of Energy team, in turn, will do its utmost to implement the resolutions of the 26th CPSU Congress.

8617
CSO: 1822/157

ENERGY-ACTIVE SOLAR BUILDINGS

Moscow ENERGOAKTIVNYYE SOLNECHNYYE ZDANIYA (NOVOYE V ZHIZNI, NAUKE, TEKHNIKE: SERIYA STROITEL'STVO I ARKHITEKTURA) in Russian No 2, Feb 82 (signed to press 15 Jan 82) pp 3-5

[Introduction from book "Energy-Active Solar Buildings" by Nikolay Pavlovich Selivanov, Izdatel'stvo "Znaniye" , 21,970 copies, 64 pages]

[Text] The primary function of a home is to shelter its inhabitants against the cold, rain, snow, broiling sun, i.e., to provide the necessary energy comfort and to establish heating, lighting and acoustic conditions favorable for human beings. The higher the level of civilization is, the greater are the demands made for a level of energy comfort and the more energy expended to achieve it. Until recently, energy needed to supply buildings with energy were met almost exclusively by burning organic fuels: wood, coal, petroleum, gas, i.e., the "stored" energy of the sun from Earth's natural warehouses; these natural reserves, alas, are not limitless. The energy consumed for this purposes ranges from 10 to 26% of the natural energy resources of various countries.

In a 24 hour period, the world's energy producing plants consume an amount of organic fuel which takes nature 1000 years to synthesize. It is burned and ejected into the atmosphere in the form of soot, smoke and toxic impurities, creating vast blankets of smog over developed cities and industrial areas, and polluting the environment, Earth's biosphere. Energy consumption is ever increasing, whereas the consumption of Earth's mineral resources has long been at irreplaceable rates. It is estimated that with the compounded rate of energy consumption, proven natural petroleum, gas and coal reserves will be depleted in several decades.

"These resources can not be replaced. We are responsible for their proper and zealous utilization not only to today's generations, but also to future generations. No one has the right to forget this," stated comrade L. I. Brezhnev, general secretary of the CPSU Central Committee, chairman of the Presidium of the USSR Supreme Soviet, who read the status report at the 26th CPSU Congress.

Banks of powerful hydroelectric generating plants are being erected in our country, signalling the current success of hydraulic engineering. Atomic energy production is being extensively and successfully developed and the first pilot plants for thermonuclear synthesis are being studied. But nuclear

fuel reserves are not inexhaustable and the use of thermonuclear synthesized energy is only in the developmental stage. "Life demands that we continue the search for fundamentally new energy sources," emphasized L. I. Brezhnev at the 26th CPSU Congress.

Which new energy sources can be utilized in building construction under these energy circumstances?

To answer this question, let us consider two facts concerning the thermal balance of a building. First, as an energy consumer, a building may be represented as a three-dimensional low-temperature thermal device with an internal heat source and an average temperature range of 14 to 28° C. In winter, a building dissipates low-potential thermal energy into the environment by means of radiation and convection through its external barrier and ventilating system. This permits us to include underground and geothermal water, wind and solar radiation in a building's thermal balance.

Second, a building is naturally and uncontrollably exposed to various external energy effects through its external barriers over its entire period of use, primarily radiant solar energy and the resultant mechanical energy of the wind and thermal energy of the soil, water, etc.

A comparison of these facts clearly shows that to resolve the problem of economy of traditional forms of energy in building construction we must make buildings which not only consume and dissipate energy, but which can also recover it from the environment using special devices, transform it, add it to the functional energy balance or store it for future use. In other words, a building should be able to increase its energy activity. Such energy-active buildings are often called solar buildings. They may be single--storeyed cottages and multi-storeyed dwellings, hotels, research centers, etc.

What then are solar buildings? Why do experts show an ever increasing interest in them? What are the engineering prerequisites and architectural and structural methods employed in their design? Finally, how can we plan and build simple solar homes in rural areas, in urban and resort developments, in garden and orchard regions? We will discuss this later. But let us begin by speaking about the sun as an energy source for solar buildings.

8617
CSO: 1822/145

UKRAINIAN SSR FUEL, ENERGY BALANCE IN 11TH FIVE-YEAR PLAN EXAMINED

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 2, Feb 82 pp 10-14

[Article by Candidates of Economic Sciences V. Nezhentsev, K. Chukayev, and M. Ayzenberg: "Fuel-Energy Balance of the Ukrainian SSR in the 11th Five-Year Plan"]

[Text] As was pointed out at the 26th CPSU Congress, the problem of further efficient, dynamic development of the fuel and energy complex and improvement of the fuel and energy balance is one of the key problems of the Soviet economy in the 11th Five-Year Plan and as a whole in the 1980's. In his Accountability Report to the 26th CPSU Congress, CPSU Central Committee General Secretary L. I. Brezhnev emphasized that "a definite precondition for accomplishing all economic tasks -- both production and social -- is the development of heavy industry. This applies particularly to its base branches, first and foremost the /fuel and energy/ [in boldface] branches." He also stated that "...the task of improving the structure of the fuel and energy balance is becoming increasingly more important."

The fuel and energy balance, both of the nation as a whole and of each union republic, is an important division of current and long-range economic and social development plans. In recent years the role of the fuel and energy balance has sharply increased in the area of balance and substantiation of our plans. This was stressed in the following important decrees adopted in 1981 by the CPSU Central Committee and USSR Council of Ministers: "On Basic Directions and Measures to Increase the Effectiveness of Utilization of Fuel and Energy Resources in the Nation's Economy in 1981-1985 and in the Period up to 1990"[1] and "On Intensifying Work in the Area of Economy and Efficient Utilization of Raw Materials, Fuel-Energy, and Other Material Resources."[2]

We should note that in the last 20 years this country's fuel and energy balance has undergone substantial changes. First of all, this country's fuel and energy resources have increased by more than 150 percent, including a 170 percent increase in fuel resources. Secondly, there has been an increase in percentage share of fuel consumed in the production of electricity and thermal energy from 32.6 to 43.1 percent (see Table 1). And, thirdly, there has been an increase in the percentage share of the most efficient energy resources (oil and gas) -- from 26.1 in 1960 to 72.3 percent in 1980 (see Table 2).

Table 1. USSR Fuel and Energy Balance (recalculated to standard fuel) (million tons)

Resources							Distribution					
Years	Total	Including					Total	Including				
		Fuel Production	Hydroelectric Power Production	Import	Other Sources	Balances at Beginning of Year		Consumed, Total	Of That		Export	Balances at End of Year
									For Producing Electricity, Thermal Energy, Compressed Air	For Production-Process and Other Needs		
1960	836.5	692.8	6.3	10.7	32.7	94	836.5	678.0	221.2	456.8	59.8	98.7
1965	1121.5	966.6	10.0	9.1	35.5	100.3	1121.5	897.8	339.8	558.0	116.7	107.0
1970	1399.8	1221.8	15.3	14.1	36.5	112.1	1399.8	1117.3	458.2	659.1	167.6	114.9
1975	1845.2	1571.3	15.5	36.5	42.8	179.1	1845.2	1412.2	613.5	798.7	238.9	194.1
1980	2172.8	1905.7	22.6	16.8	48.8	178.9	2172.8	1676.7	722.2	954.5	320.6	175.5

Table 2. USSR Fuel Production by Categories (recalculated to standard fuel) (million tons)

Years	Total Produced	Of That, by Categories					
		Oil (Including Gas Condensate)	Gas	Coal	Peat	Fuel Shale	Fuelwood
1960	692.8	211.4	54.4	373.1	20.4	4.8	28.7
1965	966.6	346.4	149.8	412.5	17.0	7.4	33.5
1970	1221.8	502.2	233.5	432.7	17.7	8.8	26.6
1975	1571.3	701.9	342.9	471.8	18.5	10.8	25.4
1980	1905.7	862.2	515.7	484.4	7.3	11.9	23.8

In the last 20 years this country's fuel and energy resources have been growing at a rapid rate, while their structure was becoming increasingly more efficient (see tables 1 and 2)

Considerable attention was focused on development of the fuel and energy complex and improvement of the fuel and energy balance in the 11th Five-Year Plan and beyond through the 1980's, at the November (1981) CPSU Central Committee Plenum and the Sixth Session of the USSR Supreme Soviet, 10th Convocation. "The plan," noted L. I. Brezhnev at the November (1981) CPSU Central Committee Plenum, "specified appreciable growth in the production of energy and fuel, especially gas. But this country's requirements are also growing rapidly. Therefore the plan called for utilization of all available instruments and incentives to achieve savings in fuel and energy."

In 1985 coal production should reach 770-800 million tons, oil and gas condensate -- 620-645 million tons; and natural gas -- 600-640 billion m^3. Generation of electric power is targeted to reach 1550-1600 billion kilowatt hours. A total of 69 million kilowatts of new generating capacity is targeted to come on-line at electric power stations, including 24-25 million kilowatts at nuclear stations. A total of approximately 132 billion rubles of capital investment is being allocated in the current five-year plan for development of the branches of the fuel and energy complex, a figure which is 50 percent greater than in the 10th Five-Year Plan.

Of all the large and diversified tasks facing the economy of the Ukrainian SSR in the 11th Five-Year Plan, at the November (1981) plenum of the Ukrainian Communist Party, the report by V. V. Shcherbitskiy, first secretary of the Central Committee of the Ukrainian Communist Party, focused particular attention on further development of the branches of the fuel and energy complex, improvement of the fuel and energy balance, and the strictest economy of fuel and energy.

Accomplishment of the tasks of further improvement of this republic's fuel and energy balance, improvement of utilization of fuel and energy resources, and increased economy of fuel and energy is extremely necessary in connection with the fact that with each passing year production of fuel resources becomes more expensive, while the rate of development of the economy dictates a steady increase in the volume of consumption of fuel and energy resources.

The most important directional thrusts of energy policy for the 1980's were deeply and comprehensively substantiated at the 26th CPSU Congress. These consist essentially in the following: reduction in the consumption of oil and refined petroleum products as boiler fuel, particularly in the electric power industry, by replacing them with natural gas and coal; accelerated growth and development of nuclear power, as well as utilization of the energy of the atom in centralized heat supply; more extensive adoption of renewable energy resources into the fuel and energy balance; improvement in the level of combined utilization of fuel and energy resources and intensified prosecution of a technical policy of achieving more efficient consumption of these resources.

Implementation of these directional thrusts will make it possible to improve the efficiency of this country's fuel and energy balance and will positively influence growth in efficiency of societal production.

The fuel and energy balance of the Ukrainian SSR, which is a component part of the USSR fuel and energy balance, occupies a special place in the latter. During the years of the first five-year plans, for example, the Donbass was an important national source of coal, supplying coal, especially coking coal, to almost all the brother republics. In the first postwar five-year plans, in connection with discovery of a number of large natural gas fields, and in particular such a unique gas field as the Shebelinka, the Ukraine also began supplying this most efficient energy resource to many brother republics. In the mid-1970's, however, the structure of the UkSSR fuel and energy balance began to change, especially its resource part. The dynamic growth rate of this republic's economy is dictating a steadily increasing volume of consumption of fuel and energy resources, while at the same time increase in production (mining) of primary energy resources is being achieved at increasingly greater cost due to the fact that large oil and gas fields are becoming exhausted, as well as worsening of mining-geologic conditions for working coal seams. Prior to the 10th Five-Year Plan export of fuel and energy resources to the other republics exceeded imports; in the 1980's, on the contrary, quantities hauled in are substantially exceeding quantities transported out. For example, while in the period 1976-1980 consumption of fuel and energy resources in this republic ran 15.4 percent above domestic fuel and energy production, in the period 1981-1985 this figure will rise to 18.6 percent.

In conformity with calculations performed at the UkSSR Gosplan Energy Scientific Research Institute, in 1981-1985 inhauling of fuel and energy resources for the needs of the economy should increase by 24.3 percent over 1976-1980. The structure of inhauling of boiler and furnace fuel in 1985 will be as follows: coal -- 8.2 percent, natural gas -- 79.8 percent, furnace fuel oil -- 9.7 percent, domestic stove fuel -- 1.5 percent, liquefied gas -- 0.6 percent, fuelwood -- 0.2 percent. An absolute increase in inhauling of boiler-furnace fuel into this republic will be covered primarily by increasing deliveries of natural gas -- by 92.5 percent. Deliveries of furnace fuel oil will increase by 7.1 percent, household stove fuel by 1.6 percent, liquefied gas by 1.5 percent, and fuelwood by 0.1 percent. At the same time deliveries of coal to this republic will decline by 2.8 percent. Outhauling of fuel beyond the republic's borders will decline, due to the necessity of priority satisfaction of this republic's requirements with its own resources.

An important feature of the fuel and energy balance of the Ukrainian SSR in the 11th Five-Year Plan is a substantial increase in the percentage share of nuclear power in the resource part -- from 0.1 percent in 1980 to 4.6 percent in 1985. Generation of electric power by renewable energy resources -- hydroelectric power -- will in 1985 remain virtually at the 1980 level, due to more extensive utilization of hydroelectric power stations to adjust electric power loads. The coefficient of electrification of the resource and expenditure parts of the fuel and energy balance will increase from 534 and 676 kilowatt hours per ton of standard fuel in 1980 to 610 and 740 in 1985, that is by 14.2 and 9.4 percent. This will make it possible more extensively and efficiently to utilize ample-supply fuels.

This republic's fuel and energy balance in the 11th Five-Year Plan will be characterized by a more rapid rise in consumption of fuel for producing electricity and thermal energy in comparison with fuel consumption for the requirements of industry, transportation, agriculture, municipal and household. This is due to the necessity of accelerating technological advance in all branches and sectors of the economy by adopting multipurpose and highly-efficient energy resources: electric power and thermal energy. Of the total volume of energy resources targeted for consumption in this republic's economy in 1985, electric power and thermal energy comprise 44 percent.

In the 11th Five-Year Plan there will be a further expansion of electrification of all branches and sectors of the economy. Increase in consumption of electric power by the branches and sectors of the republic's economy will amount to 18.6 percent, including 14.2 percent in industry, 12.1 percent in construction, 21.2 percent in transportation, 42.9 percent in agriculture, and 22.4 percent in the municipal-household sector. As a result of a higher level of electrification, there will be an increase in the electric power-worker ratio, which will greatly promote labor productivity growth, a higher level of mechanization and automation, and improvement of social conditions on and off the job.

Consumption of thermal energy in the 11th Five-Year Plan from centralized sources will increase by 13 percent, including an increase of 10.9 percent for industrial consumers and a 33.8 percent increase in the housing and municipal sector. There will be a 109.3 percent increase in consumption of boiler-furnace fuel. Industry (80.2 percent) and housing-municipal services (15.6 percent) will continue to be the major consumers of boiler-furnace fuel. The remaining branches and sectors of the economy will account for 4.2 percent of consumption of boiler-furnace fuel. Increase in consumption of principal types of fuel during the five-year period will be as follows: coal -- 106 percent, natural gas -- 115 percent, and furnace fuel oil -- 101-102 percent. The percentage share of coal in the total fuel consumption volume will decline from 48.1 percent in 1980 to 46.3 percent in 1985, furnace fuel oil will remain at 15 percent, while natural gas will rise from 30.9 to 33 percent.

Reliability of the republic's fuel and energy balance in the 11th Five-Year Plan will in large measure be predetermined by how aggressively a fuel, electric power and thermal energy economy regimen will be pursued. In this connection targets pertaining to reducing fuel and energy resource consumption standards are being established in the five-year and annual plans of economic and social development of the Ukrainian SSR. A special division has been added to the 11th Five-Year Plan, entitled "Standards and Quotas," which reflect efforts to reduce consumption standards on fuel and energy resources and basic measures aimed at achieving fuel and energy savings.

Socialist pledges adopted by the republic specified in the first year of the current five-year plan achieving savings of 2.4 million tons of boiler-furnace fuel, 3.7 billion kilowatt hours of electric power, and 5.3 million gigacalories of thermal energy, which amounts to 5.6 million tons when recalculated to standard fuel. In the period 1981-1985 targets specify achieving savings in boiler-furnace fuel of 14.6 million tons of standard fuel, electric power -- 16 billion kilowatt hours, and thermal energy -- 40 million Gcal, or

27 million tons recalculated to standard fuel. A decrease in specific fuel consumptions is targeted for all the principal fuel-intensive branches and sectors of the economy.

In the Ukrainian SSR electric power industry, specific consumption of standard fuel for generating electric power by thermal electric power stations (TES) is to be reduced from 346.5 g/kwh in 1980 to 341.3 g/kwh in 1985, or by 1.5 percent. consumption of electric power for TES internal uses will be reduced by 0.05 percent, which will produce savings of not less than 70,000 tons of standard fuel. A decrease in specific fuel consumptions in the electric power industry will be achieved by increasing by 5.5 percent utilization of the most economical K-800 power generating units and by retaining a high degree of utilization of K-300 power generating units and heating units operating at steam pressures of 130 atmospheres. At the same time the coefficient of utilization of poor-economy equipment operating at steam pressure of 90 atmospheres will be reduced by 30.2 percent, and with steam pressures below 45 atmospheres -- by 5.6 percent. A total of 1600 megawatts of poor-economy and worn-out equipment will be taken out of service, which will make it possible to save approximately 1 million tons of standard fuel.

Specific consumption of standard energy fuel for producing thermal energy will be reduced at TETs from 172.1 kg/Gcal in 1980 to 171.5 kg/Gcal in 1985 -- a 0.3 percent reduction, and at boiler houses -- from 167.7 to 166 kg/Gcal, or by 1 percent. This reduction will be achieved both by building high-output TETs and boilers and by raising the level of centralization of heat supply, plus improvement in the structure of the fuel balance of heat-producing sources.

In ferrous metallurgy the specific consumption of coke to produce a ton of pig iron will decline by 2.5 percent. Principal measures to achieve savings in energy resources in this industry will boil down to increasing iron content in the blast-furnace charge, expanding utilization of natural gas, raising blast temperature and increasing gas pressure at the furnace top. In addition, utilization of secondary energy resources will be boosted to 97-98 percent, which at the 1985 level will make it possible to save approximately 2.2 million tons of standard fuel.

In the building materials industry there will be a decrease in the specific consumption of fuel in all fuel-intensive processes; in cement production -- by 4.2 percent, in baking clay bricks -- by 3.8 percent, and in processing molten glass -- by 8.6 percent. Increased efficiency of fuel utilization in this industry is to be achieved by installing more fuel-economical furnaces and ovens, by boosting the level of concentration of facilities, development of the dry method of producing cement, and improvement of the fuel balance structure.

In housing and municipal services, fuel savings will be achieved by raising the level of concentration and centralization of heat supply sources, improving the thermal characteristics of buildings, and by increasing utilization of efficient energy resources (natural gas).

In order to achieve savings in light refined products, all efforts should be directed toward boosting the level of dieselization of motor transport, hauling by tractor-trailer and semitrailer rigs, greater efficiency of hauls, improved utilization of truck load capacity, and electrification of rail transportation. The level of freight hauled by diesel-powered trucks in the Ukrainian SSR will increase from 20.1 percent in 1980 to 32 percent in 1985, while the figure for passenger service will increase from 19.9 to 33 percent. This will make it possible to save automotive gasoline by 1985 in the amount of 0.7 million tons of standard fuel in comparison with using gasoline-powered vehicles.

Achievement of the targeted progressive changes in the fuel and energy balance in the Ukrainian SSR in all the examined areas will make it possible to ensure reliable and uninterrupted supply of fuel and energy to the economy and will promote an all-out efficiency improvement.

FOOTNOTES

1. IZVESTIYA, 15 May 1981.

2. PRAVDA, 4 July 1981.

3024
CSO: 1822/191

BUILDING OF CHIMKENT OIL REFINERY, ASSOCIATED PIPELINES GOES UNEVENLY

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 16 Apr 82 p 2

[Article by Yu. Livinskiy (Chimkent): "An Oil City Is Being Built"]

> [Text] "Complete construction of the Chimkent Oil Refinery." (From "The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990.")

Chimkent is one of the republic's large, rapidly developing industrial centers. Its potential has grown especially appreciably in recent years with the birth in the city of such important branches of the national economy as chemicals and petrochemicals. But if it can be said that the chemical industry has been formed firmly in the high-capacity Fosfor Production Association, then the petrochemical industry is even farther ahead. At the end of last year the first phase of Chimkentshina [Chimkent Tire Production Association] was put into operation. This enabled the republic to arrange for the output of "footwear" for agricultural machinery, cars and trucks for the first time. Right now construction of the association's second phase is being promoted. And not far from it still another petrochemical giant--an oil refinery--is being erected.

The national economic importance of the new industrial enterprise is very great. It will refine Siberian crude, which will arrive here over the Pavlodar-Chimkent oil pipeline, which is now being built, and it will supply the vast region of Central Asia and Kazakhstan with gasoline, diesel fuel, mazut and much other petrochemical product.

The Chimkent Oil Refinery has been under construction for several years now. During this time 60 percent of the industrial equipment called for by the design has been installed here, a machinery-repair base, a system for mechanical cleaning of industrial effluent with a discharge reservoir and an evaporator pond, a water main, an equipment base, and a GPP [step-down substation] have been built, and the first capacity at the refinery's TETs has been started up. In accordance with the list of titles of construction projects for the 11th Five-Year Plan that USSR Gosplan approved, it is planned to put the refinery into operation in 1984. But even now the builders here should have already turned over for operation the oil-loading complexes and new capacity at TETs-3. Moreover, it is planned to complete construction of the Pavlodar-Chimkent oil pipeline this year.

How are matters getting along at these construction projects, which are due for early startup?

Let us begin with the trunk pipeline over which Siberian crude will be sent from Pavlodar to the south of Kazakhstan. Its steel strand will run over steppes, sand, hills and rivers for 1,624 km. Power line supports and large oil-pumping stations will rise up along the route.

The arterial for the crude will be divided into three sections--the Pavlodar, Karaganda and Chimkent sections. Large subunits of Glavtruboprovodstroy [Main Administration for Pipeline Construction] of the USSR Ministry of Construction of Petroleum and Gas Industry Enterprises] have been working on them for a number of years.

At Chimkent I managed to meet the chief of the main controller's section of the Trans-Siberian Trunk Oil Pipelines Administration V. Tishchenko, who was visiting here on an official trip from Omsk. His section is performing technical surveillance over the progress and quality of pipeline construction, while also meeting other responsibilities.

"Work is going on substantially better on the 720-km Chimkent section than on the Karaganda and Pavlodar sections," he says. "Here 576 km of pipe have been welded, insulated, laid in the ditch and backfilled. LEP [power transmission line] supports have been installed on 540 km and wire strung on 490 km of the supports."

Nevertheless, the state of affairs on the section gives no basis for complete assurance. Much more work could be done to lay the oil pipeline. Irregularity in the shipment of pipe and late importation thereof to the designated place have been holding the construction workers back. For this reason alone mechanized columns of SU-1 [Construction Administration No 1] of Sredazneftegazstroy [Trust for the Construction of Oil and Gas Industry Facilities in Central Asia] were idled, with nothing to do, for several months last year.

Unfortunately, not all construction organizations have the proper attitude of responsibility toward the job assigned to them. Thus, mechanized columns of SU-3 and SU-6 of Svarmontazh [Welding and Assembling Trust] have been working on the Chimkent-Chulak-Kurgan route. Without completely finishing the laying of the pipe, they moved off, and for 2 years now they have not showed up at the construction project. And the work they left undone was not small. In particular, they had not made the oil-pipeline crossings over highways and rivers at Arys', Arystandy, Bugun', Badam, Burzhar and Chayan. At some segments welded pipe strands totaling 43 km in length were not insulated and were not laid in the ditch, and, on a 5-km section at the approach to the oil refinery, the pipe had not even been welded.

Simultaneous with the laying of the oil pipeline to Chulak-Kurgan, an oil-pumping station is being erected. SU-2 of Sredazneftegazstroy Trust is working ahead of schedule on this facility. But something else causes anxiety. Ten apartment houses for 120 units, a store, a kindergarten and a dining hall are to be built for the station's future operators. However, the developer, not finding a contractor, recently excluded construction of the town from the complex that is due for early startup. Such a position cannot be called anything but strange. For the servicing personnel need not just workplaces but also housing and domestic amenities.

It should be emphasized that the Pavlodar-Chimkent Oil Pipeline is a construction project of All-Union purpose. And it requires first of all the tireless attention of USSR Minneftegazstroy. Matters must be so arranged that work is performed with precision and coordination on all three sections of the facility, which is due for early startup. And for this purpose it is necessary, first of all, to create a current-operations staff for the construction project which would be in charge of and coordinate the work of all construction subunits. There is as yet no single supervisor for the big construction project.

The complex for pouring oil should be finished before the oil pipeline at the Chimkent Oil Refinery is turned over for operation. It is intended for filling up railroad tank cars with oil and sending it to Central Asian refineries. The fact is that right now Siberian oil is being delivered there by rail over thousands of kilometers, which involves great expense. Transporting it from Chimkent will enable the distance it is hauled by rail to be reduced by far, rolling stock to be released for other freight of the national economy, and enormous economic benefit to be obtained.

The startup complex for shipping oil includes, aside from the pump station, a pouring platform and two tanks for receiving raw-material petroleum, several electric-power stations, an amenities building, a steam main from the TETs, a fire department and a pump station with tanks, a dining hall, a compressor station and a number of other facilities. The Neftestroy SU of Chimkentpromstroy [Chimkent Industrial Construction Trust] is erecting them, jointly with subcontracting construction and installing organizations.

In the first year of the new five-year plan period the Neftestroy greatly overfulfilled the plan task for the NPZ [oil refinery]. But at the start of this year its position unexpectedly weakened. The program for the first quarter was not fulfilled. What was the reason?

"There were several reasons," says SU chief engineer F. Klugman. "Primarily because the plan for the NPZ was revised, the client could not for a long time define precisely the list of facilities that would be due for early startup. Moreover, in January and February the main work force of the subcontracting organizations was located at other facilities, where they were eliminating unfinished work from previous years. The installers of Kazkhimmontazh MU [Administration for Installing Chemical Industry Equipment in the Kazakh SSR], for example, are working at half strength, even to this day. All this has had its effect on plan interruption. The main work force of most installers has been at other facilities for a long time, where they have been eliminating work not done in previous years. In particular, installers of the Kazkhimmontazh MU and of the South Kazakhstan Installing Administration were included in the work with great delay. All this had its effect on plan interruption."

Unfortunately, there are chronic laggards among the construction collectives that are engaged in erecting oil-refinery facilities. Thus SMP-602 [Construction and Installing Train No 602] of Kazakhtransstroy [Kazakh Transport Construction Trust] carried out last year's plan by 72 percent. Neither did it cope with the task for the first quarter of this year.

From the very beginning, construction of the oil refinery's TETs-3, the largest in South Kazakhstan, has been proceeding unsatisfactorily. The TETs SU of

Sredazenergostroy [Central Asian Trust for the Construction of Power-Engineering Facilities] continually interrupts the planned program with great delays and with unfinished work. For example, last year the power-facility builders carried out the plan for construction and installing work by 86.1 percent, without providing for introduction of the second turbine unit into operation. The deadline for startup of this unit has now been set back for this year. Moreover, the TETs SU is to turn over two hot-water boilers and a number of other auxiliary facilities for operation now. But a high labor spirit has not been sensed yet at the construction project. The task for the first two months of the year has been interrupted again for the construction administration. Already by the end of March the trust had revised its annual plan and, naturally, its quarterly plans by way of a reduction in construction and installing work volume, as a result of which the TETs SU was transformed as quickly as lightning from a lagging organization into an advanced one. It turned out that back in February the power-facility builders had carried out the quarterly task and worked on its overfulfillment in all of March. It is asked, who needs this mixed-up planning?

In brief, not everything is going favorably yet at the major petrochemical construction project. It is the duty of construction collectives to set the situation aright at the lagging sections as quickly as possible and to mobilize all forces for the on-time turnover of important facilities that are due for early startup.

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VENTSPILS OIL-EXPORT FACILITY'S STATUS, PROBLEMS DESCRIBED

Riga SOVETSKAYA LATVIYA in Russian 4 Apr 82 p 2

[Article by V. Grammatikopulo, director of the Ventspils Office of the All-Union Association Soyuznefteeksport [All-Union Association for the Import and Export of Petroleum Product]: "The Agreement Is Working"]

[Text] From mutual complaints to mutual cooperation.

Day and night tankers are moored to the docks of the petroleum facility of the Ventspils maritime commercial port. On being loaded, they set sail for the ports of various countries. And each sailing serves as a confirmation of the good intentions of our state to live with everyone in friendship and peace and to develop mutual trade and collaboration.

The All-Union Soyuznefteeskport is one of the world's largest exporters of petroleum product. There is an office of this association in Ventspils. Our collective is not large and it has to do work that is quite tricky and important. This includes the preparation of documents for petroleum commodities and the maintenance of close business contacts with purchasers and suppliers thereof and with ships' crews. The office's workers understand that not only fulfillment of the plan for the export of petroleum product by variety and quality depends upon their work but also improvement in the organization of hauling over international routes, which is one of the requirements of the 26th Party Congress.

One cannot solve these tasks successfully all by oneself. Therefore, each year we try to strengthen mutual relations with interdependent activities. For a period of 3 years now our collective has been participating actively in an integrated socialist competition with workers of the oil area of the commercial port, the transshipment bulk plant, and the crews of the Latvian Maritime Shipping Line tankers "Grigoriy Nikolayev," "Eyzhen Berg," "Vsevolod Kochetov," "Pablo Neruda," and "Yan Sudrabkali." In the agreement on the competition, the responsibilities of the interdependent parties toward their partners were specified with precision and, naturally, each collective tries to carry them out as well as possible and to use internal reserves completely.

Our office, for example, helps in the most speedy loading of ships in every way. In the absence of one grade of cargo, we negotiate with the customers about replacing it with another that is on hand at the time. We also are introducing a method of simultaneously discharging ballast from and loading up tankers. This speeds up the work considerably.

The bulk plant workers are obligated by the agreement to support the rapid coupling of the ships' hoses and maintaining a high pace of filling with petroleum product, simultaneously providing tankage for ballast. The sailors try to use loading space volume to the utmost and to achieve uninterrupted operation of the ship's systems and mechanisms for receiving cargo and to maintain high readiness of the ships to go to sea.

In summing up the results of the integrated socialist competition for last year, we were once more convinced of its effectiveness. It helped all partners to carry out and overfulfill production tasks successfully.

For example, the crew of the tanker "Grigoriy Nikolayev" carried out the annual plan for total voyage distance by 103 percent, hauled 8,000 additional tons of cargo and saved 5 days of operating time. And the expenditures for supplying the ships with materials and equipment were reduced by 2,000 rubles.

During the second year of the five-year plan the competition participants concluded a new labor agreement and adopted increased commitments in honor of the 60th anniversary of the founding of the USSR. The results of the first 2 months of this year indicated that the matter of the competing collectives is proceeding successfully. Senior engineer of our office L. Lebedev and inspector A. Shevelev, who cope excellently with their responsibilities, should be named among the competition leaders. I should also like to note the conscientiousness and responsiveness of the workers of interdependent enterprises, such as senior controller of the Ventspils Bulk Plant L. Kapelis and senior controller A. Stepanov.

We are encouraged by the fact that a number of improvements are being made at the port. The bottom at one of the docks is being deepened at the first pier. More improved meters for all oil commodities will be installed. The preparation for utility and service lines and tanks for receiving imported oils is being completed. It is planned to rebuild two piers and to replace the hose-handling installation. All this will promote more effective work and the more rapid dispatch and receipt of cargo.

But, unfortunately, not all problems have been solved yet. Meeting the schedule for loading and unloading work depends not only upon the timely delivery of petroleum product but also upon the productivity of the operation of the cargo docks. Recently there was much left to be desired, causing above-norm idle time of ships at the outer roadstead. The matter has been complicated by the fact that since the start of this year the diesel fuel funds of Sovrybflot [Soviet Fishing Fleet] and Soyuzkoopvneshtorg [All-Union Association for Export and Import Trade with Foreign Cooperative Firms and Societies] have been shifted from Klaypeda to Ventspils. As a rule, it is hauled by low-tonnage ships. They consume just as much time as large-tonnage ships in handling at the dock, but they take on much less cargo. This has sharply raised the workload on our petroleum activity and created additional difficulties in handling the ships. Obviously, some thought should be given to the transshipment of petroleum product in Baltic ports and to distributing the workload to take into account the realistic potential. In solving this problem we expect the cooperation primarily of the Latvian Maritime Shipping Line.

The lack of teletype communications with petroleum-product suppliers and transport enterprises interferes greatly with the work. It is hoped that the Ventspils Communications Center manager will help us solve this long overdue problem. The teletype equipment will let the collective increase the responsiveness of the work and increase our contribution to strengthening mutual actions with our partners in socialist competition.

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FACETS OF DEVELOPING AZERBAIJAN OFFSHORE OILFIELDS DESCRIBED

Offshore Bridging Construction

Moscow STROITEL'NAYA GAZETA in Russian 4 Apr 82 p 2

[Article: "The Road to the Sea"]

[Text] First we travel 25 kilometers by sea on a "Rafik" minibus. Then another 2 kilometers in a motorized rail car. Then we walk about 300 more meters, and we finally get to the workplace of Valentin Nikolayevich Yeremin's brigade of SMU-1 [Construction and Installing Administration No 1], Azmorneftestroy [Azerbaijan Trust for the Construction of Offshore Oil Facilities].

Land cannot be seen from here; it is somewhere beyond the waves of the restless Caspian. Around there is only water, a narrow strip of concrete road, and derricks on metal piles that are pumping oil from the bottom of the sea. Yeremin's brigade right now is busy laying a road along the Caspian. It will be overgrown with platforms, derricks, and quarters for the oil-recovery brigades.

All work starts with the driving of piles into the bottom of the sea. The pile driver pounds the 35-meter structure 6 meters into the soil, the sea covers another 9 meters, and the rest is above the surface. Alongside it is another one. Then crane operator Ivan Zholner places here a 10-ton truss and the bridging is lengthened at once by 20 meters. Welder Mikhail Bezrodnyy firmly joins it with the road that has already been built, motorized car operator Hazim Veliyev places reinforced-concrete slabs, and installer Valeriy Polumordvinov lays them with precision on the bridging. The rotating duty period is 10 days, then vacation at home, in Baku. The annual plan is 1,747 meters.

The meters are scrupulously counted here. Because the work of the offshore builders is difficult. The Caspian is rarely quiet. For the most part a salty wind blows it about the daredevils who are trespassing upon its domain.

"But our work is interesting," says superintendent Afanasiy Andreyevich Korzhenkov. "I have been working on the sea for 33 years, and I will not exchange it for any other construction project. And the fact that at times it is difficult even makes it better: we have only real he-men left in the brigade...."

A steamboat drifts past the bridging. And even people who are accustomed to the offshore construction project pour out onto the deck to take a look at the openwork bulk of the lifting crane and the truss that are moving over the water. A

cruel wind chases the Caspian at the small brigade, it goes past the builders' faces like emergy paper. But they are going on persistently. Because it is necessary to recover the oil.

Offshore-Platform Production Plant

Moscow STROITEL'NAYA GAZETA in Russian 12 Mar 82 p 4

[Article: "A Barge Hauls an Island"]

[Text] Reporting from the future.

It will be like this. A dumping barge of inconceivable dimensions goes noiselessly to sea and, at the prescribed point, carefully overturns a metal island into the water. Its supports will go deeply to the bottom, and erectors will fasten them tightly: they will drive the piles from within and will concrete them. Not much time will pass when the wells will begin to yield crude oil.

Right now, 35 km from Azerbaijan's capital, the country's first factory for deep-water foundations is being built. In all the years of Soviet power there has not been a construction project in the republic larger than this one.

"I participated in the construction of KamAZ [Kama Motor-Vehicle Plant] and Atommash," says Abdulla Rafikov, brigade leader from Rostov's Yuzhstal'konstruktsiya [Trust for the Erection of Steel and Intricate Reinforced-Concrete Structure in the Southern Economic Region]. "And it seemed to me that nothing could be larger than those plants. The plant that we are building in Azerbaijan is somewhat smaller but it still is enormous. It occupies about 130 hectares of dry land and almost 70 hectares of the sea...."

Thus this is an unusual construction project. There are the enormous bays of the main building, which extends for 800 meters. It so big and so large in volume that the people who work there almost are not seen. Fourteen thousand tons of metal structure and 450 footings--these are only two figures that can give the builder a conception of the main building. And alongside a department for the decks is being erected, in which a crane with a load-lifting capacity of 120 tons will be installed. The Bakuites will produce support sections for the underwater footings. Their weight will vary, depending upon the depth of submergence. The lightest support will weigh 15,000 tons, the heaviest 27,500. In a year the plant will start to produce from 3 to 5 foundations.

A trip to Astrakhan awaits the regular giant structure when it leaves the ways. There the superstructure will be united to it. In addition to the drilling derricks and the production and housing premises, a dining hall, bath, shower, cinema and helicopter pad will be located on it. For about 250 people will live and work here.

Special Construction Trust No 7 of Azerbaijan's Minpromstroy [Ministry of Industrial Construction] was established to build the plant. In addition to this collective, Glavazmontazhspetsstroy [Main Administration for Installing and Special Construction Work in Central Asia], Azerbaidzhantransstroy [Azerbaijan Transportation Construction Trust] and subcontractors from many Union republics will take part in the construction project. Housing is being erected for the builders

and the plant's future workers. This will be a microrayon with 9-story apartment houses, stores, a hospital, a school, a Palace of Culture and two sports complexes.

The first deepwater foundation will leave the plant's ways during this five-year plan. Installation of the equipment will start this summer.

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BRIEFS

INTEGRATED URENGOY GAS ASSIMILATION--Novyy Urengoy (Tyumenskaya Oblast)--The integrated assimilation of the Urengoy gas field has started. Construction of the first development wells for recovering gas condensate, from which motor fuel will be produced, has been undertaken here. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 18 May 82 p 1] 11409

INCREASING TYUMEN' OIL RECOVERY--Tyumen'--Glavtyumenneftegaz [Main Administration of the Oil and Gas Industry of Tyumenskaya Oblast] drillers have set a new work record. For the first time at its fields, 1 million meters of deep wells were drilled in April alone. Not so long ago this amount of ground penetration took a year. It is noteworthy that the million meters will not last long as a record for a month: it was resolved to make this April's success the norm. Already in May it is planned to drill 100,000 meters more, and in a year it is planned to drill 2 million meters each month. High penetration speeds will help the oilfield workers to recover the valuable raw material at a rapid pace. This year alone Tyumen' oilfield workers will obtain more than 20 million more tons of crude than they did last year. [Excerpts] [Moscow KRASNAYA ZVEZDA in Russian 1 May 82 p 1] 11409

SAMOTLOR OIL DRILLING INCREASES--Tyumen', 19 May--Despite the spring flooding season, the pace of well penetration by Middle Ob' oilfield workers is increasing. The well-known brigade of A. Kuz'min from Nizhnevartovsk is setting the tone in the competition for high speeds. The collective has produced more than 30,000 meters of development wells at Samotlor and has carried out the task for the first 6 months of the year. [By V. Lisin] [Text] [Moscow PRAVDA in Russian 20 May 82 p 2] 11409

STAVROPOL' GAS OUTPUT INCREASES--Stavropol'--The collective of the Stavropol' Gas Field Administration has been coping with the annual commitments for above-plan recovery ahead of time. Fifty million cubic meters of gas and 100 tons of gas condensate above the goal have been set to customers. [By L. Leont'yeva] [Excerpt] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 May 82 p 1] 11409

RAIL TRANSPORT OF OIL--The Moscow, Belorussian, Northern, L'vov, Southern, Donetsk, North Caucasus and Sverdlovsk Railroads are overfulfilling the task. However, for the railroad network as a whole, the task was not carried out. While, let's say, the Omsk, Polotsk, Ryazan', Khabarovsk, Novyy Gor'kiy, Perm' and Moscow oil refineries maintained, as before, a high pace in loading gasoline, the plan was not fulfilled at Bashkiria's refineries or at the Volgograd, Kirishi and Saratov refineries

because tank cars were not sent there in the required numbers. Bashkiria's refineries and the Kremenchug, L'vov, Nizhnekamsk, Ryazan' and Komsomol'sk oil refineries dispatched diesel fuel well. But then the Orsk, Novyy Gor'kiy, Omsk, Lisichansk and certain other refineries did not present this fuel in the full amounts for hauling. Railroad supervisors must demand that diesel-fuel shippers carry out the plan for loading diesel fuel. Otherwise the arrears will have to be made good at a time that is most difficult for the railroads. [Text] [Moscow GUDOK in Russian 26 May 82 p 1] 11409

DEEP TURKMEN OIL HORIZONS--Nebit-Dag--The first tons of fuel have been obtained from a 5-kilometer well at the Vostochnyy Barsa-Gel'mes field. The geologists' predictions that a rich oil-bearing formation was located under a previously developed deposit was confirmed. The development of deep horizons will become, according to the specialists' testimony, an important reserve for developing the republic's oil industry. Exploration for reserves at depths of 5,000 and more meters is being conducted intensively. Since the start of the five-year plan more than 50 deep wells have been drilled, many of which have given industrial flows of oil [By Turkmeninform] [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 23 Apr 82 p 3] 11409

SHURTAN GAS FIELD READIED--The Shurtan--Uzbekistan's largest gas field, which is in the Karshi Steppe--has been turned over for development. [Text] Moscow EKONOMICHESKAYA GAZETA in Russian No 22, May 82 p 3] 11409

URENGOY GAS FACILITIES DEVELOPMENT--Novyy Urengoy--The 200-millionth cubic meter of gas has been recovered at the Urengoy field. The oilfield workers reached this mark in about 4 years. A high pace for the development of Urengoy gas was defined by 26th Party Congress decisions. The field has become a testing ground, where the most modern technical innovations are being tested. Only wells of increased diameter are being drilled here. This will enable assimilation of the especially productive subdivisions to be speeded up. Right now six subdivisions are operating at the field, and the capacity of each exceeds the designed capacity by far. But the Urengoyers say: "The main thing still lies ahead." New subdivisions of the field, which are laying gas pipelines, will be introduced. Arriving here recently were supports for an LEP-500 [500-kV power transmission line], which will enable enterprises and units to switch to a reliable power supply. The construction of a railroad that will connect the field with the Trans-Siberian Mainline is being completed. And along with it, the city of Novyy Urengoy is being erected. It is being built up with modern apartment houses. This year 250 families of drillers, derrickbuilders, geologists, power workers and builders have already celebrated housewarmings here. [By TASS] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Apr 82 p 1] 11409

TATARIYA'S NEW OIL MILESTONE--The figure "100,000,000" was lit up on the electronic display board of the Tatneft' [Tatarskaya ASSR Oil Production Association] chief controller. This is how many tons of valuable raw material Tatariya's oilfield workers have recovered since the start of the five-year plan. The goal was reached ahead of schedule. [Text] [Moscow KRASNAYA ZVEZDA in Russian 23 May 82 p 1] 11409

NEW HYDRAULIC-DRIVE OIL--Volgograd--The production of a new series of industrial oils for hydraulic drives has begun at the Volgograd Oil Refinery. They are especially effective when used in mechanisms with high-rpm spindles and other rubbing parts. Use of the new oils in the national economy will yield thousands of

rubles in annual economic benefit. [By I. Mordvintsev] [Text] [Moscow SOTSIALI-CHESKAYA INDUSTRIYA in Russian 12 May 82 p 2] 11409

ORENBURG GAS OUTPUT HIGH--Orenburg--The Orenburggazprom [Orenburg Gas Industry Association] collective has recovered and sent to customers 600 million cubic meters of gas above the goal since the start of the year. It is successfully fulfilling its socialist commitments, which call for extracting from the ground 1.1 billion cubic meters of the "blue fuel" above the annual program. The gas-field workers have widely promoted the competition in honor of the 60th anniversary of the forming of the USSR. All its subunits are working rhythmically these days and are effectively using equipment and introducing modern methods for recovering gas and for refining it. [By I. Payvin] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 May 82 p 1] 11409

KOMI OIL MINING--Yarega (Komi ASSR)--Reconstruction of the country's first underground oil mine will help to increase the recovery of raw material there. The penetrators have opened up a path to the surface for the oil. They have completed ahead of time the connector of a vertical shaft with underground galleries. This will enable the new deposits to be put into operation, labor-intensive operations at mine faces to be eliminated, and working conditions to be improved. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 15 Jun 82 p 1] 11409

OFF-THE-ROAD EXCAVATORS--Tashkent--The new vehicles of the Tashkent Excavator Plant will travel any off-the-road path confidently. Their operating reliability has been made possible by some improved components. The vehicle's cab is equipped with a heater and an air conditioner, and it is reliably protected from noise. This year hundreds of such excavators will be sent to Tyumen', the BAM [Baykal-Amur Mainline] and other construction projects of the country. [By TASS] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Apr 82 p 2] 11409

ACHAK GAS RECOVERY INCREASES--The Achakgazdobycha [Achak Gas Production Association] collective is distinguishing itself. During 27 shock-work weeks in honor of the 60th anniversary of the USSR, it recovered more than 300 million cubic meters of the "blue fuel" above the plan, 5-fold more than had been recorded in its commitments. Workers of the Achak, Kirpichli and Beurdeshik Current-Production Services made the greatest contribution to the overall affair. Having recovered an additional 40 million cubic meters of gas, the collective of Primary Gas Treatment Installation No 2 of Kirpichli Current-Production Services, where B. Babayev is foreman, emerged on the right flank of the competitors for a worthy greeting to the 60th anniversary of the forming of the USSR. In competing for a worthy greeting to the 19th Komsomol Congress, the brigades did repair work above the plan and carried out their precongress commitments with honor. [By G. Katayeva, engineer of the Standards Research Center of VPO [All-Union Production Association] Turkmengazprom. [Excerpts] [Ashkhabad TURKMENSKAYA ISKRA in Russian 24 Apr 82 p2] 11409

NEW AZERBAIJAN OIL WELL--A new well, No 482, which was drilled by the brigade of foremen I. Guseynov and R. Kuliyev of the Sangachaly Offshore Drilling Administration, has been accepted into the operating inventory of the NGDU [Oil and Gas Recovery Administration] imeni N. Narimanov. The well is operating on line with a daily flow rate of 50 tons of oil. Right now much work is being done here to sample other wells that have been received from drilling. Simultaneously with this, the oilfield workers are systematically accomplishing integrated geological and engineering measures. [By V. Tikhonov] [Excerpts] [Baku VYSHKA in Russian 23 May 82 p 1] 11409

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STUDIES IN DOMAIN OF GATHERING, INITIAL PROCESSING, TRANSPORT OF CRUDE OIL

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 5, May 82 pp 29-31

[Article by A. G. Gumerov, VNIISPTneft': "Scientific Studies in the Area of Collection, Preparation and Transport of Oil"]

[Text] VNIISPTneft' [All-Union Scientific Research Institute for Gathering, Initial Processing and Transport of Oil] works on scientific problems in the area of oilfield gathering and initial processing of crude, operation and maintenance of trunk pipelines, protection of metals against corrosion, and environmental protection in this industry. Since its founding, the institute has completed more than 600 research projects, 206 of which were completed at the level of inventions, has adopted 100 different pieces of equipment and 35 industrial processes into production, with a total economic effect of 256 million rubles. These research results are employed in all of this country's oil producing regions, but they are first adopted in Bashkiria -- some by the Bashneft' Association and others in the republic's oil pipeline administration and transport organizations.

The problem of moving crude oil mixed with water through oilfield gathering lines was addressed as a priority problem. The institute developed a method of hydraulic calculation of gathering lines figuring for laminar isothermal conditions for transfer of water-oil emulsions, which considers the specific features of the hydrodynamics of emulsions and their viscosity in relation to flow parameters. This method makes it possible to determine with sufficient accuracy for practical purposes the requisite parameters of an oilfield gathering system and to reduce the cost of moving crude.

An important area in solving this problem was the development of a process of pumping high-viscosity emulsions through oilfield gathering lines. It was recommended that a wall-adjacent layer of formation water be introduced into the flow of crude in order to reduce the hydraulic resistance of gathering lines.

In the area of field gathering of crude oil and natural gas, the institute investigated the process of separating crude, gas and water and designed high-output separators for installation in oilfields in the Soviet Union.

A device to determine free gas content in a liquid downstream of the separators made it possible to establish the quality of separation. Depulsators of new designs and flow distribution assemblies, which substantially increase the output of separator units and the degree of recovery of casinghead gas, have been installed at all large oilfield gathering, separation and treatment facilities of the Bashneft' Association.

The October experimental section has been established on the territory of the Tuymazaneft' NGDU [Oil and Gas Production Administration], with the participation of the Bashneft' Association, to speed up the development and field testing of new crude oil gathering, separation and treatment processes. At practically all NGDU of the Bashneft' Association, the institute studied the operation of separation and treatment equipment and gave recommendations on increasing their output and improving the quality of treatment.

New oil and gas separation and treatment processes, with employment of cheaper and more efficient reagent compounds based on powdered polyelectrolytes, have been adopted at the oil and gas separation and treatment facilities of the Arlanneft', Aksakovneft', Oktyabr'skneft' and other NGDU.

Considerable work has been done jointly with the work force of the Bashneft' Association on practical adoption of GOST 9965-76 -- "Crude Oil. Degree of Separation and Treatment of Crude Oil for Oil Refining Enterprises. Technical Specifications" -- developed by the institure. Adoption of measures to ensure that the quality of crude oil delivered to refineries meets the requirements of GOST 9965-76 has enabled the Bashneft' Association to obtain considerable savings. To improve the quality of treatment of oilfield wastewater, the institute has developed and installed in oilfields new equipment and devices, settling tanks, electric dehydrator units, radial-type distributing devices for settling tanks, etc.

In the area of trunk pipeline transport, a process of transferring crude and refined products has been developed and perfected, as well as methods and devices for ensuring operational reliability and repairing trunk crude oil pipelines.

The institute has devised a method of hydraulic calculation of large-diameter oil pipelines, intended for design organizations, has analyzed the operation of oil pipelines presently in service, and has laid down rules for pipeline operation at all stages of the startup process. Technical and economic substantiation has been performed on changing over the Tuymazy-Omsk-Novosibirsk crude oil pipeline to the movement of Siberian crude in the direction of Ufa.

This problem is being solved with the aid of methods of hydraulic calculation of oil pipelines for sequential movement of different batches of crude and calculation of the optimal blend of crude for delivering crude oil of a specified quality to oil refineries.

Operation of trunk and gathering line pumping equipment is improving, and work is being done jointly with partner organizations on developing new types of pump units and stations for oilfield gathering and trunk pipelining of crude.

Industry has put out a series of new types of NM centrifugal pumps for trunk oil pipelines. On the basis of full-scale testing, the institute has formulated recommendations on pump station operating conditions, recommendations which were adopted and executed in the Cherkassy Regional Trunk Oil Pipelines Administration.

Development of a network of oil pipelines in the northern areas of this country required the development of independent power supply pump-generator equipment powered by gas turbine prime movers. The first gas-turbine pump unit, the PGNU-2ZhR, rated at 800 m^3/h, designed by the institute, has been recommended for series production. An experimental model is operating on the Salavat-Orsk oil pipeline.

The institute has developed, jointly with machine builders, the 2VV 100/20 dual-screw pump for moving produced well fluids. BNIS-10,000-30 and BNIS-20,000-30 modular pump stations are being designed and built, with type NK crude oil pumps, units which are distinguished by high level of automation and reliability in comparison with equipment presently in use.

One serious problem is that of paraffin deposition in oil pipelines and storage tanks. Scrapers up to 1200 mm in diameter have been built and adopted to solve this problem, and systems have been installed to prevent the accumulation of paraffin sediments in more than 200 oil tanks of various types and sizes.

Pipelines play a leading role in the movement of crude oil, which means increasing demands on their reliability. This applies first of all to routes carrying large-diameter pipe, since malfunctions and resulting line shutdown can lead to substantial economic and ecological damage.

The institute has formulated reliability requirements for structures and equipment of trunk oil pipelines as a whole, has analyzed their operating conditions, and has devised methods of determining standard reliability indicators for lines and pump stations, as well as appropriate guideline documents. In the future it is planned to set up and put into operation a standard quality control and reliability base, as well as reliability services within this country's oil pipeline system.

Operational reliability of trunk pipelines is secured with the assistance of centralized technical servicing and maintenance (TsSTOR) technology. Following are the main indicators of effectiveness of adoption of TsSTOR: in a technical respect, decrease in the number of equipment malfunctions and an increase in total hours of operation, and in an economic respect -- decrease in the specific number of maintenance personnel and expenditures on pipeline servicing and maintenance. In order to be able to perform major repairs on coating and wrapping of operating oil pipelines without shutting down, the institute developed the PKT-1 instrument for determining the condition of coating and wrapping from the surface of the ground without uncovering an operating pipeline, as well as a group of repair-construction equipment units (excavators, cleaning, insulating and undermining machines, machines for coating and wrapping, side-boom slings, moving support for supporting exposed pipe of 1020 mm diameter, etc).

More than 250 units of the above equipment are being utilized on this country's oil pipelines. Their employment has made it possible to perform major repairs on 219-529 mm diameter trunk oil pipelines without shutting down, to boost the degree of mechanization of heavy jobs to 82.5 percent and increase labor productivity 28-fold.

Fast-setting polyurethane foam base compounds are recommended for rapid-response covering upon breakdown of a pipeline which has been emptied of oil. Equipment has been built for covering pipelines with these foaming materials.

VNIISPTneft', jointly with the UkSSR Academy of Sciences Institute of Electric Welding imeni Paton, has conducted a research project on employment of explosive energy in oil pipelining. A process has been developed and devices designed and built for cutting pipe. The process has been adopted in Bashkiria, Tataria, in Western and Northwestern Siberia. Explosive cutting is also employed in cutting in terminal branches on operating oil pipelines.

Considerable work has been done in the area of protecting metals against corrosion. VNIISPTneft', jointly with the Bashneft' Association and other institutes, has developed effective corrosion inhibitors and a process of pipeline corrosion inhibiting by the method of one-time treatment, first adopted by the Tuymazaneft' NGDU, and an effective insulating coating, Plastobit-2, for extended protection of pipe external surface against soil corrosion.

The Bashneft' Association has extensively adopted institute scientific recommendations on replacing the steel impellers of centrifugal pumps with impellers made of corrosion-resistant steel, and on preventing microbiological corrosion by employing bactericide-inhibitors.

More than half of the total volume of wastewater of the Bashneft' Association is treated with corrosion inhibitors on the recommendations of VNIISPTneft', which makes it possible substantially to reduce the frequency of breakdown of oilfield equipment due to corrosion damage.

The Bashneft' Association has developed and been the first to adopt a process of applying protective anticorrosion coatings in field conditions onto the interior surface of wastewater lines and onto the interior surface of settling tanks. This has made it possible to double or triple their service life and sharply to reduce the number of breakdowns. Seeking to shorten the time it takes to bring on-line innovations connected with protecting metal against corrosion, the institute and the Bashneft' Association have set up a full-scale test area in the Arlanneft' NGDU.

Alongside solving the above problems, VNIISPTneft', jointly with other organizations and enterprises, conducts extensive research in the area of environmental protection against the effects of oil on the atmosphere, water resources, soil, flora and fauna at all stages in its movement from well to consumer. Technical devices have been developed (mobile pump units, oil collectors, lightweight floating booms), designed to shorten the duration of spills and the time required for cleanup.

Pontoons, reflector disks, breathing and safety fittings, gas equalization and gas trapping systems have been developed and are being employed to reduce atmospheric pollution from evaporation during the production and transport of oil. Reduction in oil losses, and consequently protection of the environment as well are achieved by adopting sealed oil, gas and water gathering, separation and treatment systems.

The institute has drawn up "Standardized Technical Schemes for Oilfield Gathering, Oil, Gas and Water Separation and Treatment Systems," which have been ratified as a guideline document for designing oil gathering stations on the basis of sealed, pressurized arrangements. Highly-efficient equipment has been developed for these needs and is being put into production by industry: UVS type modular separators, preliminary skimming units, modular heaters, electric dehydrators, etc. In the period 1976-1980 and in the first half of 1981, more than 40 institute innovations were adopted at enterprises in Bashkiria and the city of Ufa, generating total savings of approximately 43 million rubles.

The institute's plans in the 11th Five-Year Plan are determined by the tasks assigned to industry by the "Basic Directions of Economic and Social Development of the USSR for 1981-1985 and the Period up to 1990." Socialist competition for improving the efficiency and quality of scientific research, rapid practical adoption of research results into production, and particularly at enterprises of the Bashneft' Association and the Bashneftekhimzavody [Bashkir Petrochemical Plants], and on the Ural-Siberian trunk oil pipeline, is intensively in progress at VNIISPTneft'.

The institute's scientists consider rapid adoption of research results at the enterprises of Bashkiria to be their duty to the republic's oil workers.

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NEW SOLUTIONS OFFERED FOR GAS PIPELINE CROSSINGS OVER LARGE WATER BARRIERS

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[Article by V. M. Kondrachuk, G. D. Skvortsov, and V. M. Suchkov, Soyuzgazifikatsiya: "Gas Pipeline Crossings Over Large Water Obstacles: New Technical Solutions"]

[Text] The use of new and effective technical solutions made it possible to construct an underwater crossing through the Volga when laying a main gas pipeline in record periods with high economic efficiency.

Selection of the optimal variant of routes for constructing super long-distance gas pipelines which transport gas from Siberia to West European sector of the country has set the task of crossing the Volga in the region with water table up to 5.5 km and depths up to 40 m. This yielded significant economic advantages.

The traditional methods of constructing underwater crossings proved to be inapplicable for a number of reasons, primarily because of the long duration of construction.

A four-branch gas pipeline crossing 720 m in diameter was built for the first time in domestic practice in 1979 from concretized pipes with total length of 22 km over the Volga by the method of lowering from a pipe-laying nonself-propelled barge. It took 5 months to lay the gas pipeline.

The task was set in 1981 of laying 46 km of pipeline 720 mm in diameter in the same period.

The location next to the previously constructed four-branch crossing of an eight-branch crossing of the Urengoy-Petrovsk and Urengoy-Novopskov gas pipelines during planning and construction drastically complicated the task and required the adoption of new solutions.

The overall dimensions of the "corridor" dictated the need for reducing in the plan the distances between the branches from 30 m required by SNiP [Construction Norms and Regulations], to 15 m. High reliability of the design of the channel pipelines, as well as accuracy of laying made it possible to obtain the

agreement of the USSR Gosstroy to make the standard stricter. Preservation of the standard distances between the crane assemblies on the coastal part of the crossing in this case was guaranteed because of Γ-shaped compensators.

The proximity of the active underwater gas pipeline complicated the planting of the production anchors of the dredging and laying vessels, drastically increased the requirements for guaranteeing work safety.

More frequent replacement of the anchors arranged behind the active pipelines, and constant monitoring of their position increased the "idle" work cycle.

The accuracy of navigational operations of the crews on the technical ships at any time of the day was guaranteed because of great accuracy of the 48 alignment signs on the shore which were equipped with powerful signal lamps. It is sufficient to say that deviation of the laying ship 0.5° from the alignment site of the crossing could result in a shifting of the pipe by 8 m on half of the crossing length.

An important condition for guaranteeing the construction project in shorter time was organizational structure of construction which was headed by the general contractor, the trust "Soyuzvolgogaz" of the all-union industrial association "Soyuzgazifikatsiya."

Coordination work began long before navigation of the Volga, the starting point for laying the pipelines.

Development of shorelines in the crossing site began under winter conditions in December 1980 in order to guarantee the approach of the pipe-laying barge and the possibility of supplying the end of the pipeline to the shore. A total of 450,000 m^3 of frozen ground was worked in a short period. At the same time a moorage was built for unloading and storing the technological reserve of concretized pipes totaling up to 6,000 T. This measure made it possible during work to exclude idling of transport vessels in the Kuybyshev Sea that were engaged in supplying concretized pipes from the plant stand from the Baku port, and guarantee smooth operation of the pipe-laying barge "Suleyman Vizirov" by the availability of a constant technological reserve.

With the approach of the navigation season on the Black and Caspian Seas, Don and Volga Rivers, with constant monitoring of water level and meteorological situation in order to guarantee normal sluicing and passage under bridges, the main technological ships were brought to the work site from the ports of Il'ichevsk and Baku: the dredging caravan "Tsyurupinsk" and the pipe-laying barge "Suleyman Vizirov," as well as the fleet of auxiliary technical vessels. A total of up to 20 floating vessels were concentrated in the crossing zone.

In April, underwater dredging operations began even before the water area of the Kuybyshev reservoir had been completely cleaned of ice. Work was done by the hydraulic dredge "Volzhskiy-511" from the shore to a depth of 8 m, and at depths from 8 to 40 m by the dredging caravan "Tsyurupinsk." A distinguishing feature of the method of preparing the underwater trench by erosion by

hydromonitors under one branch of the pipeline is preparation by the sea-going dredging vessel of beds simultaneously under four branches of the gas pipeline. The bottom was leveled at great depths by filling the basins using self-unloading dirt scows.

An important condition for high productivity of the complex in this case was the initial advance work of the dredging equipment, and further the parallel fulfillment of dredging and pipe laying operations at the production ranges. This permitted laying of no less than 500 m of ready underwater pipeline per day.

As indicated, concretizing the pipes was done under plant conditions of a special unit in Baku. The concrete under plant conditions was applied to the pipes on a reinforcing grid and anticorrosion insulation made of zinc-polystyrene coating and enamel. The insulation work included: removal of the bituminous primer by mechanical method, degreasing of the pipe surface, sand blasting cleaning, application of the coating and protective covering.

The coating was applied in two layers using a pulverizer by dry surface. In this case the presence of leakages, gaps, bubbles and blobs was not permitted. The coating was covered by five layers of PS-1184 enamel.

After the anticorrosion insulation was applied by the method of extrusion, a concrete layer was applied 52 mm thick with reinforcing zinc-plated grid to give the pipe negative buoyancy. The volume mass of the employed concrete was 2.7 T per 1 m^3. The heavy filler used was iron ore of a special grinding. Possible defects in the concrete coating were removed by guniting on the repair section. The use of concretizing to realize this project made it possible to conserve 17,000 T of pig iron and 1700 m^3 of lumber used in the traditional methods to ballast the pipeline and protect it from mechanical damages during laying.

All operations were done on the pipe laying nonselfpropelled barge (butt-joining, tack welding, welding, quality control by physical method, and insulation of the butt-joints) to prepare the length of pipe and lay it on the prepared bottom in the crossing site.

The concretized pipes were supplied from the dry cargo ships to the deck of the pipe layer by a 25-ton crane vessel. They were welded into a continuous length on the inclined roller conveyer of the deck. Monitoring of the welding, insulation of the butt-joints and equipping of the pipeline with suspended unloading pontoons was also done here. The suspended self-unloading pontoons is a technical solution which makes it possible to abandon the use of the stringer-lowering device of the ship whose transporting to the construction zone was not possible because of its large dimensions.

Three tension devices were installed on the inclined deck. They stretch the pipeline to reduce its bending and to prevent excessive stresses. Each pipe passed through all the posts until completion of a complete operating cycle. At the end of welding, gamma-defectoscopy of the welded seams was done.

A cart with radioactive source was used for pipes 720 x 16. It was placed inside the pipeline from butt-joint to butt-joint as the pipeline moved downwards over the inclined deck.

After transillumination of the seam, the film was rapidly developed. Usually the result of gamma-defectoscopy was known before the pipe-laying ship moved, and if necessary a defect in the weld could be corrected before the pipe was lowered, or if it was irreparable, eliminated. For this purpose, the pipe-laying ship was moved backwards, the pipeline in this case was pulled in the reverse direction over the inclined deck. With a positive conclusion of gamma-defectoscopy, the butt-joint was insulated by applying two layers of zinc-polystyrene coating to it, one layer of PS-1184 enamel, and two layers of polymer adhesive tape.

The pipeline was lowered to the bottom with tension up to 40 T, depending on the depth of laying. The pontoons were separated from the submerged pipeline automatically after guarantee of complete resting of the laid section on the bottom and its examination by divers. The laid lengths of the crossing 2.7 km long each were joined on the deck of the pipe-laying ship. In this case the ends of the pipelines were lifted with the help of on-board load-lifting mechanisms.

The laid pipeline was buried with the help of dirt scows. They were loaded by the dredging vessel. The great depth of the laid pipeline during burial results in great (up to 50 percent) loss of the ground because of scattering. Consequently, the efficiency experts of the trusts "Soyuzvolgogaz" and "Chernomorgidrostroy" suggested an original ground-layer of directed action. The fabrication of an experimental-industrial sample was done by in-house forces. The use of the ground-layer will make it possible to reduce losses of ground by 5-10 percent, and consequently, accelerate the burial process by almost 1.5-fold.

Monitoring of the underwater position of the pipeline was done by constant echo-sounding, as well as visual observation of the divers.

The new technical solutions guaranteed realization of the optimal route variant, high industrialization of construction of the underwater crossings in the selected site and high economic efficiency. In constructing three transcontinental gas pipelines, a conservation of 150 km of pipe 1420 mm in diameter, and 100 km of pipe 1200 mm in diameter was guaranteed. Early start-up of these systems by reducing the construction periods guarantees additional supply to the center of the country of up to 15-18 billion m^3 of gas. The calculated economic effect from work to build each of the crossings is R 35 million.

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